Development of Improved Wheatgrasses for the Southern Great Plains of the USA

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Introduction Improved forage production during the fall to spring months is needed for livestock production systems in the southern Great Plains of the USA . Digestibility , as well as forage yield and persistence (Malinowski et al . , 2003) , will need to be improved in wheatgrass cultivars for the region The objective was to compare forage yield and digestibility of advanced breeding populations and cultivars of wheatgrasses in the southern Great Plains .

Materials and methods Jose tall wheatgrass *(Thinopyrum ponticum*) was selected for improved persistence and digestibility at Iowa Park , TX , followed by a second cycle of selection (NFTW 6020) for improved digestibility and fall yield at Ardmore , OK . Barton western wheatgrass (*Pascopyrum smithii*) was selected one cycle for improved seedling vigor in the greenhouse at Ardmore , OK , and two Argentine tall wheatgrass lines (one of which was the parent material of Hulk) were selected for one cycle of improved leaf softness and shoot density (AGRAE 102) in Argentina . Six entries (Table 1) were planted in seeded sward plots in fall , 2004 at Iowa Park , in north central Texas , using a randomized complete block design with five replications . Plots were harvested in spring and fall with a plot harvester at a cutting height of 7 cm ; and sampled for dry matter and digestibility determination . Digestibility was determined using near infrared reflectance spectroscopy , verified with a wet lab procedure (Vogel et al . , 1999) on a sub-set of samples .

Results Tall wheatgrasses had generally greater forage yield and lower digestibility than western wheatgrasses (Table 1) . Hulk consistently ranked among the most productive entries . Selection for leaf softness did not result in superior digestibility in AGRAE 102 . Digestibility of Jose was equal to or greater than NFTW 6020 , whereas fall forage yield of NFTW 6020 was comparable or sometimes greater than Jose . Forage yield of NFWW 8000 was comparable to slightly better than Barton , with no differences in establishment observed .

Table 1 *Digestibility (IVD) and forage yield of wheatgrasses grown at Iowa Park , TX .*

Entry	IVD			Forage Yield			
	7-2006*	11-2006	7-2007	7-2006	11-2006	7-2007	11-2007
	%			kg ha^{-1}			
Hulk	74 .45c	87 .81	55 .77bc	6248a	4285a	16361a	1973a
Jose	80 .28b	90 .29	55 .22bc	3812b	2078bc	14729ab	1256bc
AGRAE 102	75 .75c	89 .20	53 .05c	4227b	2561b	13088b	2066a
NFTW 6020	76 .18c	85 .60	53 .95c	4432b	4380a	14690ab	1539b
Barton	87 .69a	85 .79	58 .43ab	1669c	1625c	8268d	1078c
NFWW 8000	86 .04a	85 .31	60 .49a	1529c	1809bc	10334c	1358bc

* Means followed by a different letter within a column are significant ($P < 0.05$) .

Conclusions Selection for improved digestibility was ineffective in tall wheatgrass , although fall forage yield may have improved slightly . Selection for increased seedling vigor may have inadvertently lead to slight improvement in forage yield of western wheatgrass . Hulk tall wheatgrass shows promise for forage production in the southern Great Plains . Further selection and evaluation of these wheatgrass populations is warranted .

References

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